RESOURCE INFORMATION AND AGENCY PROGRAM UPDATES

The tables in this section summarize budgetary information of the federal government for Fiscal Years 2002 and 2003. The funds shown are those used to provide meteorological services and associated supporting research that has as its immediate objective the improvement of these services. Fiscal data are current as of the end of June 2002 and are subject to later changes. The data for FY 2003 do not have legislative approval and do not constitute a commitment by the United States Government. The budget data are prepared in compliance with Section 304 of Public Law 87-843, in which Congress directed that an annual horizontal budget be prepared for meteorological programs conducted by the federal agencies.

AGENCY OBLIGATIONS FOR METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH

Table 2.1 contains fiscal information, by agency, for meteorological operations and supporting research. The table shows the funding level for Fiscal Year (FY) 2002 based on Congressional appropriations, the budget request for FY 2003, the percent change, and the individual agencies' percent of the total federal funding for FY 2002 and FY 2003.

DEPARTMENT OF AGRICULTURE (USDA)

The USDA budget request for FY 2003 is $28.8 million for operations and supporting research and representing a minor increase from FY 2002. One additional staff meteorologist was requested for the USDA's World Agricultural Outlook Board. The USDA assists the Department of Commerce in determining farmers' needs for weather information and in disseminating the information to them. Major USDA activities related to weather observations include incremental modernization of the snow telemetry (SNOTEL) system operated by the Natural Resources Conservation Service (NRCS) and the replacement of manual fire rating stations with remote automated weather stations (RAWS) by the Forest Service. The SNOTEL and RAWS networks provide cooperative data for NOAA's river forecast activities, the irrigation water supply estimates, and Bureau of Land Management operations. USDA is also actively involved in drought monitoring efforts in concert with the National Drought Mitigation Center.

For supporting research, USDA maintained a $15.5 million level to focus on the interactions of weather and climate with plant and animal production and water resources management. The goal of supporting research is to develop and disseminate information and techniques to ensure an abundance of high-quality agricultural commodities and products while minimizing the adverse effects of agriculture on the environment. The research budget does not include the coordinated effort with EPA on ultraviolet radiation. The Forest Service supports a research program, initiated in 1988, for a long-term monitoring network to assess potential effects of global climate change and variability on forest health and productivity. Work also continues in forestry ecological systems modeling.

DEPARTMENT OF COMMERCE (DOC)

All reported DOC meteorological activities are within the National Oceanic and Atmospheric Administration (NOAA). The NOAA FY 2003 total congressional request of $1.72 billion for meteorological programs represents an increase of 8.5 percent over the FY 2002 appropriated funds.

NOAA's FY 2003 operations and supporting research requests for major line office activities are described below:

<u>Weather Services</u>

Mission: The National Weather Service (NWS) provides climate, water, and weather forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure, which can be used by other governmental agencies, the private sector, the public, and the global community.

America's vulnerability to weather related hazards is rising as more of the population moves into weather threatened regions, and national and global economies become more complex. Approximately 40 percent of all Americans, some 100 million people, currently reside in areas of high risk to natural disasters, with the number climbing yearly. Today, 90 percent of all presidentially declared disasters are weather and flood related. Weather will continue to impact our lives and significantly impact the United States economy.

The NWS strives to continue mitigating these impacts through improved weather warning and forecast services. Over the last five years the NWS established specific service improvement performance goals and met most

TABLE 2.1 METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH COSTS*, BY AGENCY

(Thousands of Dollars)

	Operations			% of FY2003	Supporting Research			% of FY2003	Total			% of FY2002	% of FY2003
AGENCY	FY2002	FY2003	%CHG	TOTAL	FY2002	FY2003	%CHG	TOTAL	FY2002	FY2003	%CHG	TOTAL	TOTAL
Agriculture	12700	13300	4.7	0.5	15500	15500	0.0	4.0	28200	28800	2.1	1.0	1.0
Commerce/NOAA(Subtot)	1473955.5	1598118	8.4	65.0	109244.5	120037	9.9	31.3	1583200	1718155	8.5	58.7	60.4
NWS	743083	800844	7.8	32.6	22070	22560	2.2	5.9	765153	823404	7.6	28.4	29.0
NESDIS	704303	764726	8.6	31.1	20268	24761	22.2	6.5	724571	789487	9.0	26.9	27.8
OAR	2897	3272	12.9	0.1	52565	55774	6.1	14.5	55462	59046	6.5	2.1	2.1
NOS	12872.5	15786	22.6	0.6	12872.5	15786	22.6	4.1	25745	31572	22.6	1.0	1.1
NOAA Corps	10800	13490	24.9	0.5	1469	1156	-21.3	0.3	12269	14646	19.4	0.5	0.5
Defense(Subtot)	352120	387783	10.1	15.8	72288	55610	-23.1	14.5	424408	443393	4.5	15.7	15.6
Air Force	176207	190259	8.0	7.7	23073	18363	-20.4	4.8	199280	208622	4.7	7.4	7.3
DMSP**	8706	11591	33.1	0.5	12259	3800	-69.0	1.0	20965	15391	-26.6	0.8	0.5
Navy	123353	135472	9.8	5.5	18829	19549	3.8	5.1	142182	155021	9.0	5.3	5.5
Army	43854	50461	15.1	2.1	18127	13898	-23.3	3.6	61981	64359	3.8	2.3	2.3
Interior/BLM	1100	1100	0.0	0.0	0	0	0.0	0.0	1100	1100	0.0	0.0	0.0
Transportation(Subtot)	470256.2	456385.9	-2.9	18.6	26412.2	30862.4	16.8	8.0	496668.4	487248.3	-1.9	18.4	17.1
CG	12800	13400	4.7	0.5	0	0	0.0	0.0	12800	13400	4.7	0.5	0.5
FAA	457456.2	442985.9	-3.2	18.0	23987.2	28837.4	20.2	7.5	481443.4	471823.3	-2.0	17.8	16.6
FHWA	0	0	0.0	0.0	2425	2025	-16.5	0.5	2425	2025	-16.5	0.1	0.1
EPA	0	0	0.0	0.0	6400	7500	17.2	2.0	6400	7500	17.2	0.2	0.3
NASA	2984	2342	-21.5	0.1	154246.81	154255.75	0.0	40.2	157230.81	156597.75	-0.4	5.8	5.5
NRC	50	95	90.0	0.0	0	0	0.0	0.0	50	95	90.0	0.0	0.0
TOTAL	2313165.7	2459123.9	6.3	100.0	384091.51	383765.15	4.0	100.0	2697257.2	2842889	5.4	100.0	100.0
% of FY TOTAL	85.8%	86.5%			14.2%	13.5%			100.0%	100.0%			

*The FY 2002 funding reflects Congressionally appropriated funds; the FY 2003 funding reflects the amount requested in the President's FY 2003 budget submission to Congress.

**DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

of them through a focused emphasis on performance management and relating budgeted resources to performance. In fact, the NWS earned straight A grades in a government management report card issued by *Government Executive Magazine* and George Washington University. Also, Office of Management and Budget Director Mitch Daniels honored the NWS as an agency exemplifying the use of performance measures in management.

The FY 2003 President's Budget Request supports the funding and program requirements to enable the NWS to better use science to serve our citizens and fulfill its vision. The NWS will produce and deliver forecasts you can trust when you need them most, use cutting-edge technologies, provide services in a cost-effective manner, strive to eliminate weather related fatalities, and improve the economic value of weather information. The FY 2003 President's Budget Request will also help the NWS achieve its goal of "Working Together to Save Lives," through teamwork within the NWS and with other federal agencies.

In FY 2003, major NWS activities addressed in this budget include: accelerating nationwide implementation of the Advanced Hydrologic Prediction Services; beginning an Aviation Weather initiative; establishing a comprehensive facilities maintenance program; making operational the next generation weather and climate supercomputing system; implementing a supercomputing backup system; and completing implementation of the NWS Telecommunications Gateway Backup facility.

Overall, NOAA requests a total of $800.8 million for the NWS operations, a net increase of $57.8 million above the FY 2002 Enacted level. This continued investment includes a total of $725.3 million for Operations, Research, and Facilities (ORF) and $75.6 million for Procurement, Acquisition, and Construction (PAC). In FY 2003, the budget priorities for NWS include sustaining current services, replacing obsolete technology, enhancing services to the public and its private partners, and infusing new technology.

Operations, Research, and Facilities

The request of $725.3 million for operations and research is an increase of $52.9 million over the FY 2002 Enacted level. This continued investment will allow the NWS to maintain current services and provide improved weather warning and forecast services. Specifically, there are the following program changes:

- Aviation Weather. NOAA requests a total of $2.5 million to initiate a seven-year plan to help improve United States aviation safety and economic efficiencies by providing state-of-the-art weather observation and forecast products responsive to aviation user needs. Weather accounts for more than 70 percent of all air traffic delays which result in greater expenditures by both airline customers and the airlines. In addition, averages of 200 general aviation pilot fatalities per year are caused by weather-related accidents across the United States. In response to these trends, a joint government (DOT, DOC, and NASA) and industry team on aviation safety recently recommended the following improvements: developing and delivering pilot-friendly, real-time depictions of weather hazards; reducing forecast errors while increasing the precision of aviation parameters; and improving weather training for controllers and pilots. This initiative will address the referenced aviation safety team recommendations and provide a means for the NWS to improve its aviation weather forecast services through three major components which include: (1) increasing the number and quality of aviation weather observations; (2) transitioning applied research efforts to operational products; and (3) developing and implementing new training programs for forecasters, pilots, and controllers. This initiative has the goal of a 10 percent reduction in National Airspace System weather-related air traffic delays, which would save $600 million annually in potential economic losses, while also reducing general aviation weather related fatalities by 25 percent, or 50 lives annually. This initiative will leverage the results of several different aviation weather research efforts and expedite the operational delivery of new forecast products tailored for improving pilot awareness and avoidance of aviation weather hazards.
- Transfer of National Tsunami Hazard Mitigation Program. NOAA requests an increase of $2.3 million to reflect the transfer of the National Tsunami Hazard Mitigation Program from the NOAA Office of Oceanic and Atmospheric Research (OAR) to the NWS. Funding this program in the NWS budget will enable the NWS to incorporate tsunami hazard mitigation services, developed by OAR over the past six years, into routine operations in support of the NWS tsunami warning function. These include: operations and maintenance support for Deep-ocean Assessment and Reporting of Tsunamis (DART) buoys, and deployed seismic networks; inundation modeling and mapping efforts; tsunami hazard mitigation programs; and emergency management coordination efforts. Incorporating tsunami hazard mitigation services into an operational environment will ensure continuity of warning services and will enhance public safety.
- Terminations. The FY 2003 request proposes to terminate $18.7 million for projects funded in the FY 2002 appropriation, includ-

ing the following programs: New England data buoys ($0.75 million); Mt. Washington Observatory ($0.5 million); North Carolina Flood Mapping Pilot ($4.0 million); NOAA Weather Radio transmitters ($1.78 million); North Dakota Agricultural Weather Network ($0.27 million); WSR-88D in Mississippi ($3.1 million); ASOS-Alaska Aviation ($4.0 million).

- Local Warnings and Forecast Base-Huntsville, Alabama, Weather Forecast Office. NOAA requests $1.4 million to pay for recurring operations and maintenance costs at the new Huntsville Weather Forecast Office. The Huntsville WFO will be established in FY 2002 at the University of Alabama at Huntsville using $3.0 million appropriated funds provided in FY 2002. The $1.4 million requested will provide for NWS employee salaries, facilities rent and maintenance, and operational equipment and supplies; all necessary costs to provide and operate and maintain weather forecast and warning services in the Huntsville area.
- Advanced Hydrologic Prediction Services (AHPS). NOAA requests an increase of $4.7million over the FY 2002 Enacted level for a total of $6.2 million to accelerate nationwide implementation of improved flood and river forecast services in the Northeast, Middle Atlantic, and Southeast, including the states of New Hampshire, Vermont, Virginia, North Carolina, and South Carolina. This funding will also support continuing AHPS implementation in the Upper Mississippi and Ohio River basins. As implemented, AHPS will: (1) produce new information with better predictions of river height and flood potential to reduce loss of life and property; (2) deliver high resolution, visually oriented products to provide partners and customers with valuable information for life decisions; (3) refresh aging hydrologic forecasting infrastructure to support rapid infusion of scientific advances; and (4) leverage NOAA's investments in observational systems and atmospheric models to enhance accuracy and resolution of river forecasts. AHPS recently demonstrated improvements in flood forecasting for the Red River of the North. The mid-March 2001 AHPS 90 day outlook showed an 85 percent chance Fargo, North Dakota would experience major flooding. Three weeks later the Red River was at 20 feet above flood stage in Fargo. AHPS extends existing 1, 2, and 3 day river forecasts to 14 day and longer outlooks. This additional prediction information along with new high resolution products combine to deliver more accurate and comprehensive predictions of river height and flood potential, all using existing infrastructure and staffing levels. AHPS will greatly improve the Nation's capability to take timely and effective actions which will significantly mitigate the economic losses from major floods and droughts. AHPS will reduce loss of life and property, mitigate flood damages (three fourths of all Presidential Disaster Declarations involve flood damages), save more than $750 million per year (more than $6 billion in flood damages and adverse impacts on river commerce occur annually), and significantly improve NOAA's capability to respond to prevalent challenges with energy production and water resource stewardship.
- Weather Forecast Office (WFO) Maintenance and Repair. NOAA requests an increase of $3.0 million over the FY 2002 Enacted for a total of $7.3 million for WFO maintenance. This continued investment will allow NWS to fund recurring maintenance contracts and address a backlog of more than $10 million in deferred maintenance repair actions. In FY 2003, the NWS will begin implementing of a scheduled preventive facility maintenance program based on manufacturers' specifications and General Services Administration (GSA)/industry standards. Funds also will be dedicated to begin cyclical replacements and to address high priority backlog repair actions at 20 WFOs. The WFOs provide forecasters with modernized facilities, that support the advanced technology systems and provide weather service to the public. As the WFOs continue to age, the facilities require a significant investment in recurring and cyclic maintenance, including replacing major facility support systems such as power backup generators and uninterruptible power supplies. The request will allow the NWS to protect the $250 million capital investment in modernized facilities in accordance with GSA and private industry standards.
- Systems Operations. The total request of $93.3 million in Systems Operation and Maintenance (O&M) represents an increase of $2.1 million over the FY 2002 Enacted level. This continued investment provides the necessary resources to maintain these capital investments. The Systems O&M total also includes $43.9 million for Next Generation Weather Radar (NEXRAD) O&M, $8.7 million for Automated Surface Observing System (ASOS) O&M, $37.7 million for Advanced Weather Interactive Processing System (AWIPS) O&M, and $3.0 million for the NWS Telecommunications Gateway Backup.
- NWS Telecommunications Gateway Backup (NWSTG). NOAA requests $3.0 million for the National Weather Service Telecommunications Gateway Backup. After scheduled deployment in early FY 2004, the $3.0 mil-

lion will cover recurring costs for NWSTG backup communications, system software licenses, systems operations and maintenance support, facility rent, and cyclical technology refreshment. This will ensure uninterrupted delivery of critical meteorological data necessary for the protection of life and property, and the economic well being of the Nation. The NWSTG Backup operations will meet the operational availability requirement of 99.99 percent.

- Mandatory Pay and Inflationary Costs. NOAA requests an increase of $23.8 million to fund adjustments to base for NWS activities. The increase will fund the estimated FY 2003 federal pay raise of 2.6 percent and annualize the FY 2002 pay raise of 4.6 percent. The increase will also provide mandatory inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the GSA. Also included in this amount of $52.3 million is $28.4 million, which supports the Administration's proposal to fund all of the Civil Service Retirement System payments out of agency budgets.

Procurement, Acquisition and Construction (PAC)

The total request of $75.6 million represents an increase of $4.8 million over the FY 2002 Enacted level. Of this request a $7.5 million decrease is requested for the NWSTG Backup to reflect the completion of one-time costs associated with the planned acquisition and construction of backup infrastructure and facilities. The specific requests are listed below:

- NWS Weather and Climate Supercomputing. NOAA requests an increase of $6.2 million over the FY 2002 Enacted level for a total of $21.2 million to continue operations and maintenance of the current NWS IBM SP system and to transition the next generation weather and climate supercomputing system into operations (system to be acquired and installed during FY 2002). The NWS supercomputer is the foundation for all NWS weather and climate forecasts. Operational transition of the next generation supercomputer will enable the NWS to improve the resolution and forecast accuracy of the following prediction models by FY 2004: medium range forecast (global) model from 80 kilometers (Km) to 52Km; regional severe weather (Eta) model from 12Km to 10Km; and the hurricane model from 18Km to 12Km. In addition, this investment will enable the NWS to upgrade its operational climate forecasting model to incorporate ocean temperature and current influences, critical to predicting weaker El Niño and La Niña events and other climate oscillations.
- NWS Weather and Climate Supercomputing Backup. NOAA requests $7.1 million to implement an operational backup system for the NWS weather and climate supercomputer. The NWS weather and climate supercomputer is a critical component of NOAA's mission. Many of the data, products and services provided by and through the Central Computer System (CCS) directly contribute to issuing life saving NWS watches and warnings to the public. During FY 2003, the NWS will acquire the necessary backup system hardware capability, conduct site selection, and install the backup.
- Radiosonde Replacement Network. NOAA requests an increase of $2.0 million over the FY 2002 Enacted level for a total of $7.0 million to continue the replacement and modernization of the upper air radiosonde network. The radiosonde network provides critical upper air observations for NWS weather forecasters and serves as the principle data source for all weather forecast models. The current network is obsolete and nearing collapse, risking widespread loss of data within the next two to three years. During FY 2003, the NWS will accelerate system deployment of radiosonde telemetry units and begin use of Global Positioning Satellite (GPS) technology radiosondes at sites as they become operational.
- Next Generation Weather Radar (NEXRAD). NOAA requests $8.2 million to continue level funding of NEXRAD Product Improvement (NPI) activities during FY 2003. The NPI program infuses new science and technology into the current radar network. During FY 2003 the NWS begins full scale development of the Open Systems Radar Data Acquisition unit (ORDA). Upon its deployment in FY 2005-2007, ORDA will provide increased data resolution for detecting tornados and extend the effective range of the radar for predicting damaging winds. These advances in conjunction with Open Systems Radar Product Generator (ORPG) technology, deployed in FY 2002, and AWIPS Build 5 will result in improved warning lead times for tornadoes and improved forecast accuracy for severe thunderstorms and flash floods.
- Automated Surface Observing System (ASOS). NOAA requests $5.1 million to continue level funding for ASOS sensor improvement activities. The NWS is developing and implementing new ASOS sensor capabilities to meet user requirements and decrease maintenance demands. In FY 2003, NWS plans to complete acquisition of all-weather precipitation gauges. An additional 231 gauges will be acquired for a total of 346. Of these, NWS will deploy 209 gauges in

FY 2003. NWS also will complete deployment of 314 dewpoint sensors, begin full scale development of enhanced precipitation identifier sensors and begin development of a 25,000 ft. ceilometer that will begin deployment in FY 2005. Each of these new sensors will improve the maintainability, measurement quality and utility, and will fully meet NWS and aviation weather observation requirements.

- Advanced Weather Interactive Processing System (AWIPS)/ NOAAPort. NOAA requests $16.3 million for AWIPS development activities, associated hardware upgrades, and integration of improved NEXRAD data. In FY 2003, NWS will continue technology infusion activities to integrate improved radar data from the Open Systems Radar Product Generator (ORPG), enhance data management capabilities, deliver required unique capabilities to NCEP and regions outside the contiguous United States, increase communications bandwidth to facilitate access to new radar and computer model data, and continue hydromet decision assistance development. Communications and hardware capacity improvements will be facilitated by the continuing implementation of LINUX technology at the WFOs. NWS will also complete implementation and begin operations of the AWIPS Network Control Facility backup facility in Fairmont, West Virginia. This mitigates the last single point of failure component in the AWIPS network (master ground station deployed in FY 2001) necessary to protect critical infrastructure. Combined with NEXRAD product improvement, AWIPS Build 5 capabilities and ongoing technology infusion programs will improve severe weather warning and forecast services.
- NWS Weather Forecast Office (WFO) Construction. NOAA requests a total of $10.6 million for critical facility modernization efforts in the NWS. In FY 2003, NWS plans to construct the new WFO facility in Key West, Florida, continue nationwide WFO heating, cooling and air conditioning (HVAC) corrections, complete post construction facility preparations at the Alaska Tsunami Warning Center, complete WSO facility modernization at Nome and Kotzebue, Alaska, and begin architecture and engineering work for the new WSO facility at Annette, Alaska.

Environmental Satellite, Data, and Information Services

Proposed funding for FY 2003 includes an increase in the Polar-Orbiting Satellite Program of $64.3 million and a decrease in the Geostationary Satellite Program of $35.1 million. These changes allow for continuation of procurements to provide the spacecraft and instruments, launch services, and ground systems necessary to assure continuity of environmental satellite coverage. The FY 2003 budget request will maintain a system of polar-orbiting satellites that obtains global data and a system of geostationary satellites that provides near-continuous observations of the Earth's western hemisphere. Funding is included for NOAA's share of the converged NOAA and Department of Defense (DOD) polar-orbiting system that will replace the current NOAA series and the DOD Defense Meteorological Satellite Program (DMSP).

A total of $4.0 million is requested to continue the Ocean Remote Sensing Program, which began in FY 1995. During the next several years, NOAA will acquire data from foreign and other non-NOAA satellites that will provide measurement of ocean currents, surface winds and waves, subsurface temperature and salinity profiles, ice thickness and flows, and other marine factors.

An increase of $13.2 million is included to maintain basic mission services including maintenance and operation of satellite ground facilities; provision of satellite-derived products, including hazards support; and conduct of research to improve the use of satellite data. An increase of $2.6 million is requested to accelerate the assimilation and use of satellite-based data in numerical weather prediction models and an offsetting decrease is included as the result of reducing funds for the Global Winds Demonstration Program (-$2.0 million).

Budgetary changes netting to a decrease of $4.3 million are included in the NOAA Data Centers and Information Services subactivity. The changes include an increase in base operating funding (+$10.3 million). Decreases include elimination of funding for Regional Climatic Centers (-$3.0 million), reductions in GOES Data Archive Project (-$2.0 million), and reductions in funding for Data Preservation (-$9.6 million).

Ocean Service

Funding provided through the FY 2003 budget should allow the continuation of the second generation of the NOS CO-OPS advanced data quality control program, the Continuous Operational Real-time Monitoring System (CORMS II), as well as the implementation of its development program of the Ocean Systems Test and Evaluation Program (OSTEP). The FY 2002 budget has allowed for sufficient support to operate the National Water Level Observation Network (NWLON) and the Physical Oceanographic Real-Time System (PORTS). The FY 2003 anticipated budget will not allow for full operation of the NWLON in terms of meeting yearly maintenance requirements, however. Both the NWLON and PORTS programs have subsets of operational water level stations with meteorological sensors installed for various partners and users.

Under the NOAA-Wide Coastal Storms Initiative (CSI), targeted stations of existing federal and state tide station networks have been funded to be enhanced with new meteorological sensors. Under a NOAA Ocean Service Partnership Proposal funded for FY 2002, a subset of the NWLON in the Great Lakes will be enhanced with new meteorological sensors and with continuous GPS. The portion of the funding (new money) in both of these projects targeted towards meteorology is approximately $300,000.

Office of Atmospheric Research

Requested funding for FY 2003 for Weather and Air Quality research is $59.0 million--a net increase of $3.6 million. Increases included a base adjustment of $1.8 million to partially cover inflationary cost increases as well as $2.2 million transfer of pension responsibility from the Office of Personnel Management. There also were programmatic increases of $8.5 million for: NOAA-wide Energy Security Program initiaitve ($6.1 million); the United States Weather Research Program (directed principally toward improving hurricane track predictions) ($1.0 million), base restoration ($0.4 million), and tornado/severe storm research (phased-array radar) ($1.0 million). In addition, there were two programs transferred into the Weather and Air Quality research base before being proposed for termination--Atmospheric Investigation Regional Modeling Analysis and Prediction (AIRMAP) ($3.0 million) and Central California Ozone Study ($0.25 million). Finally, terminations were also proposed for New England Air Quality Study ($1.0 million), Air Quality Forecasting Pilot Program ($3.0 million), High-Resolution Temperature Forecasting Pilot Program ($3.0 million), 3-D Ceilometer in Hawaii ($0.5 million), the "STORM" Program at the University of Northern Iowa ($0.35 million), and the space-based wind profile lidar technology program for incorporating wind-profile data into forecast models.

National Polar-orbiting Operational Environmental Satellite System (NPOESS)

The FY 2003 DOC/DOD budget for NPOESS is $474.398 million. FY 2003 funds will be used for the development of system architecture, technology development efforts, and critical sensor and algorithm development plus the award of System Engineering, Manufacture, and Development (EMD) contract. NPOESS is scheduled to be available in 2008 as a backup to the final launch of the NOAA polar-orbiting satellites and DMSP satellites. This system will exploit advanced hardware and software technologies to produce a more reliable, longer-lived spacecraft with greater mission capability.

DEPARTMENT OF DEFENSE (DOD)

The DOD total budget request for FY 2003 is $443.4 million which represents a funding increase of 4.5 percent from FY 2002. Specific highlights for each of the military departments are described below:

United States Air Force

United States Air Force (USAF) resources for meteorological support fall into several categories: general operations, investment and research, DMSP operations, and DMSP and National Polar-orbiting Operational Environmental Satellite System (NPOESS) supporting research. The Air Force request (including DMSP and NPOESS) for FY 2003 is $240.9 million.

General Operations: The operations portion of the FY 2003 budget request is $190.2 million and provides the day-to-day environmental support to the DOD. These funds will pay for support to the USAF (both active duty and reserve components), the United States Army, nine unified commands, and other agencies as directed by the Chief of Staff of the Air Force. Over 4,900 people conduct these activities at over 200 worldwide locations. These people include active duty military, Air Force reservists, Air National Guard weather flight personnel, weather communications and computer specialists, and civilians.

General Supporting Research: The FY 2003 budget request for Air Force supporting research is $18.3 million. The Air Force continues the spiral development of the Space Weather Analysis and Forecast System (SWAFS). This project and other research efforts will investigate the electrodynamics of the Sun and Earth's magnetosphere, ionospheric dynamics, mesoscale meteorology, visible and infrared properties of the environment, and cloud parameterization and prediction.

DMSP Operations: Though funding for DMSP comes from the Air Force, this system is the major source of space-borne meteorological data for the military services and other high-priority DOD programs. Environmental data from DMSP sensors is also distributed to the National Weather Service (NWS), National Environ-mental Satellite, Data, and Information Service (NESDIS), the Navy's Fleet Numerical Meteorology and Oceano-graphy Center (FNMOC) and the Naval Oceanographic Office (NAVOCEANO), and AFWA according to the Shared Processing Program agreement.

The operations portion of the FY 2003 budget request is $11.6 million. The major portion of this funding is for on-orbit operations, tactical terminal maintenance, and long-haul communications. These funds also pay operations costs for one dedicated command and control facility. DMSP funds for 93 military and civilian personnel associated with the operation of, and to a much smaller extent, the procurement of the DMSP system.

DMSP and NPOESS Supporting Research: The FY 2003 budget for DMSP R&D is $3.8 million. The funds will be used for launch vehicle integration; system integration and testing; and mission sensor calibration, validation, and algorithm development efforts. The FY 2003 DOD R&D budget for NPOESS is $237.2 million. FY 2003 funds will be used for the development of system architecture, technology development efforts, and critical sensor and algorithm development. NPOESS is scheduled to be available in 2008 as a backup to the final launch of the NOAA polar-orbiting satellites and DMSP satellites. This system will exploit advanced hardware and software technologies to produce a more reliable, longer-lived spacecraft with greater mission capability.

United States Navy

The United States Navy FY 2003 budget request for meteorological programs is $155 million. The request includes $135.4 million for operational programs and $19.5 million for supporting research.

The Navy Meteorology and Oceanography (METOC) program is truly unique. Focusing support in the environmentally complex coastal/littoral regions around the globe, Navy METOC is required to provide an assessment of the impact of weather and ocean phenomena on weapon systems. Additionally, and just as important, Navy METOC provides for safe flight and navigation in support of Naval, joint, and combined forces operating throughout the world's oceans. This task is accomplished with a cadre of highly trained military and civilian personnel, schooled in both the sciences and warfighting applications. By teaming with and leveraging the efforts of other agencies and activities, Navy METOC meets these challenges in a most cost-effective manner, providing a full spectrum of products and services with only about 5 percent of the federal weather budget.

The Navy METOC program is required to provide comprehensive and integrated weather and ocean support worldwide. The Oceanographer of the Navy sponsors programs in four closely related disciplines - meteorology, oceanography, geospatial information and services, and precise time and astrometry. All are used to protect ships, aircraft, fighting forces, and shore establishments from adverse ocean and weather conditions, and to provide a decisive tactical or strategic edge by exploiting the physical environment to optimize the performance and efficiency of platforms, sensors, and weapons.

Owing to the crucial interrelationship of the oceans and the atmosphere, the Navy requires various oceanographic products to provide the requisite meteorological services. In addition to aviation and marine METOC support, the Navy provides a variety of unique services on demand, such as electro-optical, electro-magnetic and acoustic propagation models and products, METOC-sensitive tactical decision aids, and global sea ice analyses and forecasts.

Support to Navy operations is provided under the direction of the Commander, Naval Meteorology and Oceanography Command located at the Stennis Space Center, Mississippi. Naval METOC support starts with sensing the battlespace physical environment and culminates with weapons arriving on target and personnel operating in the battlespace without being adversely affected by physical environmental phenomena. Operational support for the Navy and Marine Corps includes the day-to-day provision of meteorological and oceanographic (METOC) products and services. As naval operations in the littoral increase, Navy METOC support is directed towards providing on-scene capabilities to personnel that directly furnish environmental data for sensor and weapon system planning and employment. These on-scene capabilities are key elements for enabling the warfighters to take advantage of the natural environment as part of battlespace management.

Navy METOC systems acquisition is accomplished through the Space and Naval Warfare Systems Command, San Diego, California. Several major METOC operations support systems are being procured or undergoing upgrades.

Navy METOC Research and Development (R&D) is cooperatively sponsored by the Oceanographer of the Navy and the Chief of Naval Research. This area is not generally system-specific; instead, Navy R&D efforts typically have applications to meteorological, oceanographic, and/or tactical systems. Navy's tabulation of budget data includes R&D funding for basic research, applied research, demonstration and validation, and engineering and manufacturing development.

Initiatives of the Navy and Marine Corps, under sponsorship of the Oceanographer of the Navy, transition projects from exploratory development to operational Naval systems. Such efforts include advances in the Navy's METOC forecasting capability, enhancements to communications and data compression techniques, further development and improvement of models to better predict METOC parameters in littoral regions, and an improved understanding of the impact these parameters have on sensors, weapon systems, and platform performance.

United States Army

The United States Army estimates a requirement for $50.5 million for operational support and $13.9 million in research and development in FY 2003. Costs for operational support to the Air Force Combat Weather Teams are estimated, as these expenses are normally part of the overall G-3 or G-2 operating budget at the MACOM, Corps, Division, or Brigade level. Composite

rates for military and civilian personnel are used for figuring Army personnel costs. Operational support is projected to increase approximately $7.1 million over the FY 2002 expenditures, research is estimated to decrease about $4.2 million from the previous year, and real staffing should decrease by approximately 5 percent. Systems upgrades and acquisitions at Army Materiel Command (AMC) for the Integrated Meteorological System (IMETS) and the Meteorological Measuring Set - Profiler (MMS-P) programs account for the bulk of the projected increase in operational funding for the Army in this year's report. Decreases in funding for research at Army Research Laboratory, specifically for the University Partnership for Operational Support, where funding ended in FY 2002, account for most of the decrease in research and development funding for the Army. Costs for personnel are up slightly this year due to the annual increase in the standard composite rate for military and civilian personnel.

Army monies for meteorology are spent in four main areas: support to United States Army Artillery Met Sections (ARTYMET), support to United States Air Force Combat Weather Teams at Army locations, research and development related to the Army mission, and the development, production, and maintenance of Army meteorological systems.

United States Army Major Commands (MACOMs) with Staff Weather Officers and their associated Combat Weather Teams (CWTs) provide the same support and services to Air Force weather personnel that they normally provide to Army personnel. This support is provided at all levels within the MACOM where Air Force Weather personnel are assigned. Support to Air Force CWTs includes the use of facilities for weather operations, medical support, the use of training facilities, office supplies, utilities and maintenance for weather facilities, vehicles and tactical equipment, and funding for official travel. Eighth United States Army, United States Army Europe, United States Army Pacific, Forces Command, and Training and Doctrine Command all provide support to Air Force weather personnel assigned at the MACOM level and below.

Major portions of MACOM meteorological budgets go to support Artillery Meteorology Sections, also known as ARTYMET Teams, or Met Sections. Artillery Met Sections release weather balloons and track their movement to measure both direction and speed of upper level winds. Wind data are then passed to the United States Army Artillery units for firing computations. Artillery Met Sections range in size from six personnel at a Light Division to twelve personnel at a Heavy Division. There are twenty-five Met Sections in the Active Component, with each Met Section averaging four hundred balloon flights per year. There are forty-eight Met Sections in the Army National Guard (ARNG), with each Met Section averaging approximately one hundred balloon flights per year. The ARNG's forty-eight teams employ 288 part time personnel. Each of these Guardsmen trains an average of 39 days per year, equating to 31 FTE positions for this report. Eighth United States Army, United States Army Europe, United States Army Pacific, Forces Command, and the Army National Guard all support Met Sections. Training and Doctrine Command supports twenty-four military and civilian personnel at the United States Army Artillery School at Fort Sill, Oklahoma. These personnel train ARTYMET Teams on the use of the AN/TMQ-41 Meteorological Measuring Set.

The Army Corps of Engineers - Civil Operations has programmed funds in FY 2003 for operational programs and basic research related to meteorology. The Army Corps of Engineers - Military Operations has programmed funding for meteorological research and development efforts related to Army transportation and aviation.

Space and Missile Defense Command (SMDC) supports several meteorological missions. SMDC has funding designated for the operational support at the High Energy Laser Systems Test Facility (HELSTF) for contract services to operate and maintain the instrumentation, equipment, and facilities to support the atmospheric sciences/meteorological mission. HELSTF has also set aside monies for systems acquisition for repair and replacement of meteorological instrumentation and for data services. SMDC also operates contract support services to operate the Ronald Reagan Missile Defense Test Site for operations support and special weather programs. ARSPACE provided space weather support through a 0.5 staff year contract in FY 2002 but is not funded for FY 2003. FDIC provides space weather support through a 0.5 government staff year effort for FY 2002 and programmed to continue for FY 2003.

Army Materiel Command will fund a variety of activities for FY 2003, most of which fall into research and development and for systems acquisition. AMC will fund developmental and testing costs associated with the MMS Profiler and the Integrated Meteorological System (IMETS). The Communications Electronics Command (CECOM) will buy additional MMS's for the National Guard in FY 2003. Army Research Laboratory, Battlefield Environment Division, will continue to focus on basic research this year. The Army Research Office saw a small decrease in funding from FY 2002 to FY 2003 for basic research. The Small Business Innovative Research (SBIR) Program and the Defense University Research Instrumentation Program

(DURIP) were provided funds for selected research projects.

Headquarters, Department of the Army, Deputy Chief of Staff, G-2 employs two full-time meteorologists for development of meteorological policy, coordination of meteorological support within the Department of the Army and with other Department of Defense and federal agencies and organizations, Department of the Army Policy concerning weather, environmental services, and oceanographic support to the Army (less those environmental services functions assigned to the Corps of Engineers), and Department of the Army policy concerning peacetime weather support and point weather warnings. This office also sponsors a company grade Army liaison officer at the Air Force Weather Agency in Omaha, Nebraska and a field grade Army officer at the National Polar-orbiting Operational Environmental Satellite System Integrated Program Office in Silver Spring, Maryland.

Variations from last year's budget among the MACOMs for operational support include one-time equipment purchases in FY 2002 at USARPAC, special programs related to training, operations, and maintenance of weather equipment in USAREUR, decreases in IMETS operations and maintenance costs in USARPAC, slight increases in supply and travel costs in FORSCOM, and special program costs for instructors, evaluators, and operators at the Artillery, Aviation, and Intelligence Schools in TRADOC.

It is anticipated that FY 2003 funding for weather-related environmental research efforts at United States Army Research Institute of Environmental Medicine (USARIEM) will continue at or near the FY 2002 level.

DEPARTMENT OF THE INTERIOR (DOI)

The DOI/BLM fire weather funding request for FY 2003 is $1,100,000. This figure is for meteorological operations and support of the Bureau of Land Management (BLM) remote sensing requirements for Remote Automatic Weather Station (RAWS) and Lightning Detection Programs. Normal operations and maintenance of the restructured Fire RAWS program is approximately $800,000. (This includes personnel, vehicles, per diem, normal procurement and facilities).

The BLM optimization of RAWS will continue in 2003 as part of the Wildland Fire Agencies' consolidation of Fire Weather and National Fire Danger Rating Support. Complete optimization will take a few more years. Subsequent cost savings in operations costs will be used to replace aging equipment and upgrade sensor packages. Proposed changes in Lightning Detection operations will further reduce the out-year expenditures in this program. Coordination between DOI agencies and the USDA Forest Service regarding combined meteorological requirements for the National Wildland Fire support functions is ongoing. During the coming geographic area review efforts, interagency RAWS replacement coordination will continue to maximize National Fire Danger Rating System (NFDRS) sampling points and minimize the total number of systems required in the West.

DEPARTMENT OF TRANSPORTATION (DOT)

The DOT total budget request for FY 2003 is $487.2 million which represents a funding decrease of 1.9 percent from FY 2002. The meteorological programs for the Federal Aviation Administration, Federal Highway Administration, and the United States Coast Guard for FY 2003 are described below:

Federal Aviation Administration (FAA)

For 2003, FAA has requested a total $471.8 million for the Aviation Weather Programs including acquisition of new systems, operations and support, and supporting research. The actual funding for aviation weather in FY 2002 was $481.4 million. The $10 million decrease in FY 2003 constitutes a 2 percent reduction in total funding. The changes are comprised of decreases in acquisitions of $31.1 million (-26.3 percent) to $87.2 million, as systems are maturing and entering field operations; increases in operations and support of $16.7 million (+5 percent) to $355.9 million, reflecting salary increases for air traffic specialists, contract weather observers and maintenance personnel; and an increase for aviation weather research of $4.9 million to a total of $28.8 million.

The funding changes reflect major progress in the aviation weather program bringing much automation to the collection of weather observations from remote sensors, to the dissemination of weather products, graphics and decision making information for use by the air traffic facilities, pilots, the aviation industry and general aviation users. Specific programs that will see a change in funding greater than $2 million are listed below:

Programs	Changes ($ Millions)
Systems Acquisition:	
Operational and Supportability Implementation System (OASIS)	-10.2
Weather and Radar Processor (WARP)	-10.4
Integrated Terminal Weather System (ITWS)	-2.6
Weather System Processor (WSP)	-4.0

Stand Alone Weather Sensor (SAWS)	-3.4
Terminal Doppler Weather Radar (TDWR)	2.9
NEXRAD Enhancements	2.4
Operations Support:	
Equipment Maintenance	2.2
Contract Weather Observations (CWO)	3.1
Flight Service Stations (FSS)	8.8
Research	
Aviation Weather Research Program (AWRP)	4.8

The AWRP will use this increase in funding to continue research into understanding the geophysical phenomenom in the atmosphere and around airports that present hazardous conditions for aircraft operations. Among these are in-flight icing, turbulence, visibility, ceiling, convective activity, tornadoes, etc. Additional work will be done to improve models, develop better graphics for decision making information, and the impacts of space weather.

Federal Highway Administration (FHWA)

The total FHWA request for surface transportation weather programs in FY 2003 is $2.0 million all of which will be used for supporting research and special programs.

In 1999, the FHWA began documentation of road weather requirements, which has served as the basis for the majority of work in this area. This work includes addressing the technical aspects of the road transportation system (including weather data collection, processing and dissemination) as well as the institutional challenges surrounding system implementation. These institutional challenges encompassed coordination within state and local Departments of Transportation as well as across the transportation and meteorological communities. With regard to technical areas of interest, data collection efforts will include increased coverage of road condition observations and incorporate road weather data (e.g., pavement and subsurface observations) into broader meteorological observation networks. Better processing includes the application of higher resolution weather models and the development of road condition prediction models (e.g. heat balance models) that are needed to develop the appropriate transportation weather information. In addition, surface transportation decision-makers require weather information disseminated in formats that are easily understood and in which human factors issues have already been incorporated. This need will be achieved through the development of improved road weather decision support systems. A multiyear effort has been undertaken by the FHWA in cooperation with six national labs to prototype and field test advanced decision support components for winter maintenance. This effort will lead to demonstration of the MDSS in the 2002/2003 winter. In addition, the decision support components will be made available to private vendors, who can incorporate them into their products. The FHWA will continue to develop outreach and training course material for program delivery, training, and promotion. FHWA is also taking an active role in promoting more efficient transportation operations during hurricane evacuations. Three regional workshops were held in the Spring 2002 that brought together emergency managers, traffic managers, and highway patrol to discuss methods to improve evacuations. The FHWA is currently supporting an Evacuation Traffic Information System (ETIS), which is a web-based program that facilitates the sharing of evacuation and traffic information among states. In addition, the FHWA is investigating other Intelligent Transportation System technologies that can be used to support emergency and transportation managers during evacuations. Finally, the FHWA is researching how transportation operation centers around the country integrate weather information into their traffic management operations. The FHWA is interested in the types of information received (whether generic or tailored) and how that information impacts traffic management decisions. The FHWA is also investigating several other aspects of traffic management with respect to weather, including the modification of traffic signal timing, traffic modeling, and freeway operations in response to adverse weather.

United States Coast Guard (USCG)

All of USCG's funding for meteorological programs is for operations support. For FY 2003, the requested funding level is $13.4 million. (The Coast Guard does not have a specific program and budget for meteorology--all meteorological activities are accomplished as part of general operations.) The Coast Guard's activities include the collection and dissemination of meteorological and iceberg warning information for the benefit of the marine community. The Coast Guard also collects coastal and marine observations from its shore stations and cutters, and transmits these observations daily to the Navy's Fleet Numerical Meteorology and Oceanography Center and NOAA's National Weather Service. These observations are used by both the Navy and NOAA in generating weather forecasts. The Coast Guard also disseminates a variety of weather forecast products and warnings to the marine community via radio transmissions. Coast Guard shore stations often serve as sites for NWS automated coastal weather stations, and the National Data Buoy Center provides logistics support in deploying and maintaining NOAA offshore weather buoys. The International Ice Patrol conducts iceberg surveillance operations and provides warnings to mariners on the presence of icebergs in the North Atlantic shipping lanes. Coast Guard efforts in meteorological operations and services have not

changed significantly during recent years. Beginning with this Federal Plan, funding levels include the costs of relaying observations, broadcasting NWS products, and servicing NDBC buoys.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

All of the EPA'S funding of meteorological programs is for supporting research. The anticipated funding level in FY 2003 for directed meteorological research is $7.5 million which is a 17.2 percent higher than the FY 2002 funding level. Currently, increased attention is being paid to the effects of airborne toxics and particulate matter on human health.

In addition, to promote excellence in environmental science and engineering, EPA established a national fellowship program and substantially increased its support for investigator-initiated research grants. The increase in funding for grants (with reliance on quality science and peer review) and for graduate fellowships (to support the education and careers of future scientists) will provide for a more balanced, long-term capital investment in improved environmental research and development.

The funding for the grants program will remain about $100 million in FY 2003. This augmented program will fund research in areas including ecological assessment, air quality, environmental fate and treatment of toxics and hazardous wastes, and exploratory research. The portion of these grants that will be awarded for meteorological research during FY 2003 cannot be foreseen, but it is probable that the grant awards will increase the base amount of $7.5 million listed above for directed meteorological research.

EPA is continuing its development and validation of air quality dispersion models for air pollutants on all temporal and spatial scales as mandated by the Clean Air Act, as amended in 1990. Research will focus on indoor, urban, mesoscale, regional, and multimedia models which will be used to develop air pollution control strategies, and human and ecosystem exposure assessments. There will be increased emphasis placed on meteorological research into regional and urban formation and transport of ozone and particulate pollution in support of the revisions to the National Ambient Air Quality Standards. Increased efficiency of computation and interpretation of results are being made possible by means of supercomputing and scientific visualization techniques.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

For FY 2003, NASA requests a total of $156.6 million. The majority of this funding ($154.3 million) is for supporting research.

These funding levels are composed of the estimated meteorology share of the supporting research and analysis programs as well as Earth Observing System (EOS) and Earth Probe instruments, EOS science, and the EOS Data Information System elements of the NASA Office of Earth Science budget. In parallel with deploying EOS, NASA Earth Science Enterprise is looking ahead to determine what will be the important Earth science questions in the next decade, and which require NASA's leadership to be answered. Drawing on existing reports of the National Academy of Sciences and the state of progress in current scientific endeavors, ESE has developed a Research Strategy for 2000-2010. This strategy articulates a hierarchy of one overarching question, five broad subordinate questions and twenty- three detailed questions that can and should be tackled over this decade. For each, the Research Strategy defines the observational requirements, which in turn provide the basis for definition of candidate missions to be pursued. An early, high priority in this time frame is the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Program (NPP), which will serve to provide continuity with the Terra and Aqua missions as well as a demonstration of instruments for the converged weather satellite program. NASA and the Integrated Program Office (IPO) jointly fund the NPP mission. The IPO consists of representation from the three agencies participating in NPOESS: NASA, the National Oceanic and Atmospheric Administration, and the Air Force. NASA plans to meet its immediate commitments and ensure the success of the EOS Terra, AQUA, AURA and IceSAT missions. In addition, NASA is committed to deliver a functioning data and information system to support the processing, archival, and distribution of data products from these missions.

NASA also funds a $55.7 million program of weather-related research for aviation safety.

NUCLEAR REGULATORY COMMISSION (NRC)

The NRC requested funding is for meteorological operations. The request of $95,000 in FY 2003 is to continue technical assistance for the analysis of atmospheric dispersion for routine and accident releases from nuclear facilities.

The meteorological support program in the NRC is focused primarily on obtaining and analyzing meteorological data to be used in atmospheric transport and dispersion models. These models provide insight on plume pathways in the near-and far-fields for building wake and dispersion characteristics to perform dose calculations on postulated and actual releases to the environment. Obtaining current and accurate meteorological information on a real-time basis that is representative of the facility location is nec-

essary to evaluate releases to the environment in an emergency situation. In addition, meteorological information is used as input to probabilistic safety assessments, assessments of the radiological impacts of routine releases from normal operations, assessments of other (non-radiological) hazards that may impact safe operation of the facility, and assessments of design or operational changes proposed for the facility. Also, the nuclear power industry has expressed an interest in seeking site approvals for new nuclear power plants. As many as three early site permit applications are anticipated in FY 2003. The NRC may seek assistance from other Federal agencies to support its safety reviews.

AGENCY FUNDING BY BUDGET CATEGORY

Table 2.2 depicts how the agencies plan to obligate their funds for meteorological operations broken down by "budget category." The two major categories are "Operations Support" and "Systems Acquisition." To a large degree, these categories correspond to non-hardware costs (Operations Support) and hardware costs (Systems Acquisition). For agency convenience in identifying small components that do not fit into these two major categories, a third category is added called "Special Programs." Programs that provide support to several government agencies such as the Air Force's DMSP are listed on a separate line.

In FY 2003, Operational Costs requested are $2.46 billion with a total of $1.5 billions (61.1 percent) for Operations Support, $932 million (37.9 percent) for Systems Acquisition, and $24.8 million (1 percent) for Special Programs.

Table 2.3 describes how the agencies plan to obligate their funds for meteorological supporting research according to budget categories. The agencies' supporting research budgets are subdivided along similar lines--Research and Development (non-hardware), Systems Development (hardware), and Special Programs (for those items that do not easily fit into the two major categories).

For FY 2003, agencies will obligate a total of $383.8 million in Supporting Research funds in the following manner: $290.9 million (75.8 percent) to research and development, $71.7 million (18.7 percent) to Systems Development, and $21.1 million (5.5 percent) to Special Programs.

TABLE 2.2 AGENCY OPERATIONAL COSTS, BY BUDGET CATEGORY

(Thousands of Dollars)

AGENCY	Operations Support FY2002	Operations Support FY2003	Systems Acquisition FY2002	Systems Acquisition FY2003	Special Programs FY2002	Special Programs FY2003	Total FY2002	Total FY2003	Total %CHG	% of FY2003 TOTAL
Agriculture	12700	13300	0	0	0	0	12700	13300	4.7	0.5
Commerce/NOAA(Subtot)	747027.2	813317	713270	771085	13658.3	13716	1473955.5	1598118	8.4	65.0
NWS	581109	631964	151344	158250	10630	10630	743083	800844	7.8	32.6
NESDIS	141177	150691	561926	612835	1200	1200	704303	764726	8.6	31.1
OAR	2897	3272	0	0	0	0	2897	3272	12.9	0.1
NOS	12144.2	15056	0	0	728.3	730	12872.5	15786	22.6	0.6
NOAA Corps	9700	12334	0	0	1100	1156	10800	13490	24.9	0.5
Defense(Subtot)	287680	313354	63590	73566	850	863	352120	387783	10.1	15.8
Air Force	131438	140100	44769	50159	0	0	176207	190259	8.0	7.7
DMSP*	8706	11591	0	0	0	0	8706	11591	33.1	0.5
Navy	122663	134752	690	720	0	0	123353	135472	9.8	5.5
Army	24873	26911	18131	22687	850	863	43854	50461	15.1	2.1
Interior/BLM	940	940	160	160	0	0	1100	1100	0.0	0.0
Transportation(Subtot)	342604.2	359082.6	118276	87154.6	9376	10148.7	470256.2	456385.9	-2.9	18.6
CG	12800	13400	0	0	0	0	12800	13400	4.7	0.5
FAA	329804.2	345682.6	118276	87154.6	9376	10148.7	457456.2	442985.9	-3.2	18.0
FHWA					------ Not Applicable ------					
EPA					------ Not Applicable ------					
NASA	2184	2284	171	0	629	58	2984	2342	-21.5	0.1
NRC	50	95	0	0	0	0	50	95	90.0	0.0
TOTAL	1393185.4	1502372.6	895467	931965.6	24513.3	24785.7	2313165.7	2459123.9	6.3	100.0
% of FY TOTAL	60.2%	61.1%	38.7%	37.9%	1.1%	1.0%	100.0%	100.0%		

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.3 AGENCY SUPPORTING RESEARCH COSTS, BY BUDGET CATEGORY

(Thousands of Dollars)

AGENCY	Research & Development		Systems Development		Special Programs		Total			% of FY2003
	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	%CHG	TOTAL
Agriculture	15500	15500	0	0	0	0	15500	15500	0.0	4.0
Commerce/NOAA(Subtot)	70762	78211	21260	21690	17222.5	20136	109244.5	120037	9.9	31.3
NWS	2680	2740	19390	19820	0	0	22070	22560	2.2	5.9
NESDIS	20268	24761	0	0	0	0	20268	24761	22.2	6.5
OAR	46345	49554	1870	1870	4350	4350	52565	55774	6.1	14.5
NOS	0	0	0	0	12872.5	15786	12872.5	15786	0.0	4.1
NOAA Corps	1469	1156	0	0	0	0	1469	1156	-21.3	0.3
Defense(Subtot)	71273	54735	0	0	1015	875	72288	55610	-23.1	14.5
Air Force	23073	18363	0	0	0	0	23073	18363	-20.4	4.8
DMSP*	12259	3800	0	0	0	0	12259	3800	-69.0	1.0
Navy	18829	19549	0	0	0	0	18829	19549	3.8	5.1
Army	17112	13023	0	0	1015	875	18127	13898	-23.3	3.6
Interior/BLM					------ Not Applicable ------					
Transportation(Subtot)	26337.2	30787.4	0	0	75	75	26412.2	30862.4	16.8	8.0
CG					------ Not Applicable ------					
FAA	23987.2	28837.4	0	0	0	0	23987.2	28837.4	20.2	7.5
FHWA	2350	1950	0	0	75	75	2425	2025	-16.5	0.5
EPA	6400	7500	0	0	0	0	6400	7500	17.2	2.0
NASA	106400	104200	47800	50000	46.805	55.747	154246.81	154255.75	0.0	40.2
NRC					------ Not Applicable ------					
TOTAL	296672.2	290933.4	69060	71690	18359.305	21141.747	384091.51	383765.15	-0.1	100.0
% of FY TOTAL	77.2%	75.8%	18.0%	18.7%	4.8%	5.5%	100.0%	100.0%		

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.4 AGENCY OPERATIONAL COSTS, BY SERVICE

(Thousands of Dollars)

	Basic Meteorology		Aviation		Marine		Agriculture & Forestry		General Military		Other		Total	
AGENCY	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003
Agriculture	0	0	0	0	0	0	12700	13300	0	0	0	0	12700	13300
Commerce/NOAA(Subtot)	1345886	1464200	69240	70680	55933	59966	0	0	0	0	2897	3272	1473955.5	1598118
NWS	630783	685984	69240	70680	43060	44180	0	0	0	0	0	0	743083	800844
NESDIS	704303	764726	0	0	0	0	0	0	0	0	0	0	704303	764726
OAR	0	0	0	0	0	0	0	0	0	0	2897	3272	2897	3272
NOS	0	0	0	0	12873	15786	0	0	0	0	0	0	12872.5	15786
NOAA Corps	10800	13490	0	0	0	0	0	0	0	0	0	0	10800	13490
Defense(Subtot)	21340	23438	218890	236685	35649	39154	0	0	66502	75389	9739	13117	352120	387783
Air Force	0	0	173006	184322	0	0	0	0	0	0	3201	5937	176207	190259
DMSP*	0	0	8706	11591	0	0	0	0	0	0	0	0	8706	11591
Navy	21340	23438	36636	40230	35649	39154	0	0	23190	25470	6538	7180	123353	135472
Army	0	0	542	542	0	0	0	0	43312	49919	0	0	43854	50461
Interior/BLM	0	0	0	0	0	0	1100	1100	0	0	0	0	1100	1100
Transportation(Subtot)	0	0	457456	442986	12800	13400	0	0	0	0	0	0	470256.2	456385.9
CG	0	0	0	0	12800	13400	0	0	0	0	0	0	12800	13400
FAA	0	0	457456	442986	0	0	0	0	0	0	0	0	457456.2	442985.9
FHWA							------ Not Applicable ------							
EPA							------ Not Applicable ------							
NASA	0	0	0	0	0	0	0	0	0	0	2984	2342	2984	2342
NRC	50	95	0	0	0	0	0	0	0	0	0	0	50	95
TOTAL	1367276	1487733	745586	750351	104382	112520	13800	14400	66502	75389	15620	18731	2313165.7	2459123.9
% of FY TOTAL	59.1%	60.5%	32.2%	30.5%	4.5%	4.6%	0.6%	0.6%	2.9%	3.1%	0.7%	0.8%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.5 AGENCY SUPPORTING RESEARCH COSTS, BY SERVICE

(Thousands of Dollars)

	Basic Meteorology		Aviation		Marine		Agriculture & Forestry		General Military		Other		Total	
AGENCY	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003
Agriculture	0	0	0	0	0	0	15500	15500	0	0	0	0	15500	15500
Commerce/NOAA(Subtot)	94747	102626	1625	1625	12872.5	15786	0	0	0	0	0	0	109244.5	120037
NWS	22070	22560	0	0	0	0	0	0	0	0	0	0	22070	22560
NESDIS	20268	24761	0	0	0	0	0	0	0	0	0	0	20268	24761
OAR	50940	54149	1625	1625	0	0	0	0	0	0	0	0	52565	55774
NOS	0	0	0	0	12872.5	15786	0	0	0	0	0	0	12872.5	15786
NOAA Corps	1469	1156	0	0	0	0	0	0	0	0	0	0	1469	1156
Defense(Subtot)	6262	6167	23073	18363	18829	19549	0	0	23642	11031	482	500	72288	55610
Air Force	0	0	23073	18363	0	0	0	0	0	0	0	0	23073	18363
DMSP*	0	0	0	0	0	0	0	0	12259	3800	0	0	12259	3800
Navy	0	0	0	0	18829	19549	0	0	0	0	0	0	18829	19549
Army	6262	6167	0	0	0	0	0	0	11383	7231	482	500	18127	13898
Interior/BLM	------ Not Applicable ------													
Transportation(Subtot)	0	0	23987.2	28837.4	0	0	0	0	0	0	2425	2025	26412.2	30862.4
CG	------ Not Applicable ------													
FAA	0	0	23987.2	28837.4	0	0	0	0	0	0	0	0	23987.2	28837.4
FHWA	0	0	0	0	0	0	0	0	0	0	2425	2025	2425	2025
EPA	0	0	0	0	0	0	0	0	0	0	6400	7500	6400	7500
NASA	0	0	46.805	55.747	0	0	0	0	0	0	154200	154200	154246.8	154255.7
NRC	------ Not Applicable ------													
TOTAL	101009	108793	48732	48881.1	31701.5	35335	15500	15500	23642	11031	163507	164225	384091.5	383765.1
% of FY TOTAL	26.3%	28.3%	12.7%	12.7%	8.3%	9.2%	4.0%	4.0%	6.2%	2.9%	42.6%	42.8%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

AGENCY FUNDING BY SERVICE CATEGORY

Table 2.4 summarizes how the agencies plan to obligate operational funds for basic and specialized meteorological services; Table 2.5 is a similar breakout for supporting research funds.

Table 2.4 reveals the distribution of FY 2003 operational funds: basic meteorology services receiving 60.5 percent; aviation 30.5 percent; marine 4.6 percent; agriculture/ forestry 0.6 percent; general military services 3.1 percent; and other specialized services accounting for 0.8 percent. Table 2.5 shows the distribution of supporting research funds among the services with basic meteorology receiving 28.3 percent, aviation 12.7 percent, marine 9.2 percent, agriculture and forestry 4.0 percent, general military 2.9 percent, and the remaining 42.8 percent dedicated to other meteorological services.

The definitions of specialized and basic services are described below:

Basic Services

Basic services provide products that meet the common needs of all users and include the products needed by the general public in their everyday activities and for the protection of lives and property. "Basic" services include the programs and activities that do not fall under one of the specialized services.

Specialized Meteorological Services

Aviation Services. Those services and facilities established to meet the requirements of general, commercial, and military aviation.

Marine Services. Those services and facilities established to meet the requirements of the DOC, DOD, and DOT on the high seas, on coastal and inland waters, and for boating activities in coastal and inland waters. The civil programs which are directly related to services solely for marine uses and military programs supporting fleet, amphibious, and sea-borne units (including carrier-based aviation and fleet missile systems) are included.

Agriculture and Forestry Services. Those services and facilities established to meet the requirements of the agricultural industries and federal, state, and local agencies charged with the protection and maintenance of the nation's forests.

General Military Services. Those services and facilities established to meet the requirements of military user commands and their component elements. Programs and services which are part of basic, aviation, marine, or other specialized services are not included.

Other Specialized Services. Those services and facilities established to meet meteorological requirements that cannot be classified under one of the preceding categories; such as, space operations, urban air pollution, global climate change, and water management.

PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS

Table 2.6 depicts agency staff resources in meteorological operations. The total agency staff resources requested for FY 2003 is 14,462. This total represents an increase of 0.1 percent from FY 2002.

TABLE 2.6 PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS
(Units are Full Time Equivalent Staff Years)*

AGENCY	FY 2002	FY 2003	% CHANGE	% of FY 2003 TOTAL
Agriculture	105	106	0.9	0.7
Commerce/NOAA (Subtotal)	5,809	5,809	0.0	40.2
NWS	4,726	4,726	0.0	32.7
NESDIS	883	883	0.0	6.1
OAR	32	32	0.0	0.2
NOS	114	114	0.0	0.8
NOAA Corps	54	54	0.0	0.4
Defense	4,983	4,965	-0.4	34.3
Air Force (Subtotal)	3,266	3,233	-1.0	22.4
Air Force Weather	3,201	3,140	-1.9	21.7
DMSP	65	93	30.1	0.6
Navy	1,421	1,450	2.0	10.0
Army	296	282	-5.0	1.9
Interior (Subtotal)	12	12	0.0	0.1
BLM	8	8	0.0	0.1
Reimbursed**	4	4	0.0	0.0
Transportation (Subtotal)	3,539	3,568	0.8	24.7
FAA	3,431	3,459	0.8	23.9
FHWA	2	3	33.3	0.0
USCG	105	106	0.0	0.7
EPA	0	0	0.0	0.0
NASA	0	0	0.0	0.0
NRC	1	2	50.0	0.0
TOTAL	14,449	14,462	0.1	100.0

* Numbers of personnel are rounded to nearest whole number.
** "Reimbursed" are personnel funded by other agencies.

INTERAGENCY FUND TRANSFERS

Table 2.7 summarizes the reimbursement of funds from one agency to another during FY 2002. Agencies routinely enter into reimbursable agreements when they determine that one agency can provide the service more efficiently and effectively than the other. While specific amounts may vary from year-to-year, the pattern shown is essentially stable and reflects a significant level of interagency cooperation.

Department of Commerce. NWS will reimburse DOT $2,500 for Alaska housing utilities. NASA will receive $60,000 for stratospheric studies. NESDIS will transfer a total of $279.5 million to NASA for procurement and launches of polar-orbiting ($90.5 million) and geostationary ($189 million) satellites.

Department of Defense. The Air Force will reimburse DOC a total of $3.6 million for operations [OFCM support ($140,000), Lightning Data ($579,000), NCEP operations ($13,000), and Shared Processing Network ($190,000)] and $2.7 million for NEXRAD supporting research. In addition, the Air Force will reimburse NSF $150,000 for COMET supporting research activities. The Navy will reimburse DOC $215,000 for basic climatological analysis and forecasting, and interagency coordination. The Army reimbursements to DOC/NOAA include $570,000 from COE to NWS for maintaining precipitation reporting stations and $230,000 from COE and ARL to NOAA laboratories for precipitation modeling and basic/applied research. The Army TRADOC will also reimburse the AF Air Combat Command $56,000 for operations and maintenance of weather systems. Finally, the United States Geological Survey will be reimbursed by COE $700,000 for operations and maintenance of hydrologic and precipitation reporting stations.

Department of Transportation. The FAA will reimburse NOAA $36.9 million in FY 2003. Included in those funds are development of enhancements and operational support associated with the WSR-88D, ASOS maintenance, the Center Weather Service Units at all Air Route Traffic Control Centers, the World Area Forecast System, meteorology instructors at the FAA, and studies and OFCM support.

The FAA will reimburse the Army a total of $40,000 and the Navy $340,000 for supporting research. The NASA will receive $20,000 for supporting research.

National Aeronautics and Space Administration (NASA). The Air Force will be reimbursed a total of $2.178 million--$1.428 million for observations, forecasts, and operations/maintenance of weather infrastructure and replacement of upper air systems at Trans-Atlantic Abort Landing Sites and $750 million for technology transition at Applied Meteorology Unit, Eastern Range. NOAA's NWS will receive $16,000 for upper air analysis and research; National Data Buoy Center will receive reimbursements of $97,000 for the operation of two data buoys. NASA will also reimburse GSA $666,000 for replacement of upper air weather support systems at Transatlantic Abort Sites.

Environmental Protection Agency (EPA). NOAA's Air Resources Laboratory (ARL) will receive $7.5 million for development, evaluation, and application of air quality dispersion models; and for provision of meteorological expertise and guidance for EPA policy development activities.

Nuclear Regulatory Commission (NRC). The NRC enjoys a unique relationship with the DOE as a result of the Energy Reorganization Act of 1974. The act realigned the Atomic Energy Commission into a regulatory organization-NRC and a research and promotional organization-ERDA (which was subsequently absorbed into DOE). As a result, the NRC has access to the DOE national laboratories for technical assistance activities. This assistance, while not a reimbursable agreement, results in the transfer of funds from NRC for specific technical assistance by DOE laboratories. In FY 2003, the NRC will task DOE laboratories at a funding level of $95,000.

FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

Table 2.8 indicates the number of facilities/locations or platforms at which the federal agencies carry out (or supervise) the taking of various types of meteorological observations.

TABLE 2.7 INTERAGENCY FUND TRANSFERS FOR METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH

Agency Funds Transferred from:	Agency Funds Transferred to:	FY 2002 Funds ($K) Estimated or Planned Operations	Supporting Research
Commerce/NOAA	DOT/USCG	2.5	
	NASA Studies	60	
	NASA	279,496	
Defense/Air Force	DOC/NOAA/OFCM	140	
	DOC/NOAA/LDS	579	
	DOC/NOAA/NCEP	13	
	DOC/NOAA/SPN	190	
	DOC/NOAA/NWS		2,676
	NSF/COMET		150
Defense/Navy	DOC/NOAA/NCDC	50	
	DOC/NOAA/OFCM	165	
Defense/Army	DOC/NOAA/NWS	570	
	DOC/NOAA/ETL		80
	DOC/NOAA		150
	DOI/USGS	700	
	DOD/USAF/ACC	56	
Transportation/FAA	DOC/NOAA	30,557	6,352
	DOD/USA		40
	DOD/USN		340
	NASA		20
NASA	DOD/USAF	1,428	750
	DOC/NOAA/NDBC	97	
	DOC/NOAA/NWS		16
	GSA	666	
EPA	DOC/NOAA/ARL		7,500
NRC	DOE/PNNL	95	

TABLE 2.8 FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2002)
Surface, land	
Commerce (all types)	841
Air Force (U.S. & Overseas)	130
Navy (U.S. & Overseas)	72
Army (U.S. & Overseas)	39
Marine Corps (U.S. & Overseas)	13
Transportation (Flight Service Stn)	8
Transportation (Lim Aviation Wx Rptg Stn)	114
Transportation (Contract Wx Obsg Stn)	189
Transportation (Auto Wx Obsg Stn)	198
Transportation (Auto Sfc Obsg Sys, fielded)	569
Transportation (USCG Coastal)	100
Interior	470
Agriculture	1080
NASA	3
Surface, marine	
Commerce (SEAS-equipped ships)	140
Commerce (Coastal-Marine Autom Network)	65
Commerce (NOAA/NOS/PORTS)	6
Commerce (Buoys--moored)	64
Commerce (Buoys--drifting)	21
Commerce (Buoys--large navigation)	10
Commerce (Water-level gauges)	*175
*Number of which have meteorology sensors	59
Navy (Ships with met personnel)	29
Navy (Ships without met personnel	289
Transportation (USCG Cutters)	225
NASA	2
Upper air, balloon	
Commerce (U.S.)	86
Commerce (Foreign, Cooperative)	22
Air Force, Fixed (U.S. & Overseas)	12
Air Force, Mobile	15
Army, Fixed (U.S. & Overseas)	10
Army, Mobile	97
Navy, Fixed (U.S. & Overseas)	11
Navy, Mobile	47
Navy, Ships	29
Marine Corps, Mobile	14
NASA (U.S.)	2
Atmospheric Profilers	
Army	7

TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2002)
Upper air, rocket	
NASA	1
Army (U.S. & Overseas)	1
Doppler weather radar (WSR-88D) sites	
Commerce (NWS)	123
Air Force (U.S. & Overseas)	29
Army (U.S. & Overseas)	2
Transportation	12
Doppler weather radar (Not WSR-88D) sites	
Air Force (Transportable)	3
Navy (Fixed)	9
Marine Corps (Mobile)	10
Off-site WSR-88D Processors (PUPs)	
Commerce (NWS)	63
Air Force	140
Navy	24
Army	6
Marine Corps	9
Transportation	25
NASA	2
Airport terminal Doppler weather radars	
Transportation (Commissioned)	45
Army (not airfield--Test Range/USAREUR)	2
Conventional radar (non-Doppler) sites	
Commerce (NWS)	31
Commerce (at FAA sites)	27
Air Force, Fixed (U.S. & Overseas)	7
Air Force, Remote Displays	2
Air Force, Mobile Units	3
Marine Corps, Mobile units	15
Weather reconnaissance (No. of aircraft)	
Commerce (NOAA)	3
Air Force Reserve Command (AFRC)	10
Geostationary meteorological satellites (No. operating)	
Commerce (planned config of 2)	2
Polar meteorological satellites (No. operating)	
Commerce (planned config of 2)	2
Air Force	4
Navy	(1 in orbit, status TBD)